Significant Incident Report No. 237

Subject: Failure of crane head sheave

Date: 12 January 2016

Summary of incident

In July 2014, a mobile crane at a mine site was being used to unload a truck. After a daily pre-start inspection, the crane took the weight and lifted the load. As the crane started to slew, the nylon head sheave (rooster sheave) weighing about two kilograms, catastrophically failed. Part of the sheave fell around 10 metres to the ground, narrowly missing a rigger working in the exclusion zone below.

When the sheave was inspected later, it appeared to have been damaged prior to the lift.

The weight of the load was within the crane's safe limit. There was no side loading to the boom head sheave during the lift. The sheave was an original equipment manufacturer (OEM) supplied part.

Damage to nylon head sheave. Right. Half of the failed sheave for the auxiliary hook remained in place. Left. Sheave sections recovered after the incident.

Direct causes

- The damaged head sheave failed and fell from height during a lift.

Contributory causes

- Damage to the head sheave was not identified during the daily pre-start inspection of the crane by workers.

Actions required

The following actions are recommended to reduce the potential for damage and failure of head sheaves.

Design, manufacture, import or supply requirements

Persons who design, manufacture, import or supply classified plant for use at a mine must ensure that the plant is designed, constructed and tested in accordance (in the case of a crane or hoist) with AS 1418 [r. 6.33, Mines Safety and Inspection Regulations 1995].

Records and inspections

Competent persons who are in charge of mobile cranes should ensure:

- crane maintenance records are checked and cranes are inspected for defects before entering site
- crane inspection programs are reviewed and revised to include inspection and assessment of sheaves.

Operation and maintenance

- Check all sheaves for alignment, damage (e.g. cracking), wear, mobility and extreme soiling before starting a crane operation.

  Note: Head sheaves cannot be adequately inspected when the boom is in operation.

- Operate cranes in accordance with the OEM's specifications, including avoiding side loading on sheaves.
- Maintain sheave blocks in accordance with the OEM's specifications.
- Double-blocking should not be practiced, including when moving or packing the crane. A spotter should be available to direct the crane operator where there is the potential for double-blocking.

  Note: Double-blocking (sometimes known as two-blocking) happens when the hook block or headache ball makes contact with the head sheave(s) preventing further winding up of the hoist.

- A hoist-limit switch or hoist-limit alarm should be fitted to mobile cranes to stop the winch or to warn the operator before the hook block or headache ball makes contact with the head sheave(s).

Reporting incidents

Persons who operate, or are in charge of registered classified plant (e.g. cranes), must ensure that incidents where registered classified plant is damaged (or is suspected to be damaged) are notified in writing to the State Mining Engineer [r. 6.36 Mines Safety and Inspection Regulations 1995].

Further information

- Standards Australia, www.standards.org.au

  AS1418.5 *Cranes, hoists and winches – Mobile cranes*

  AS 2550.1 *Cranes, hoists and winches – Safe use – General requirements*

This Significant Incident Report was approved for release by the State Mining Engineer on 12 January 2016